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**GAO**Report to Congressional Committees and  
Subcommittees

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**August 1986****AIRCRAFT  
IDENTIFICATION****Improved Aircraft  
Identification  
Capabilities: A Critical  
Need**

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**Comptroller General  
of the United States****B-220251**

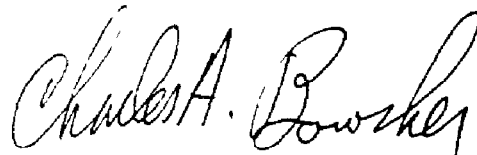
August 11, 1986

To the Chairmen of Selected  
Committees and Subcommittees

This report examines whether current capabilities for identifying aircraft allow the United States and the North Atlantic Treaty Organization air defense forces to effectively use their weapons under all combat conditions. It also addresses whether steps could be taken to better use these existing identification capabilities. Finally, the report examines whether the joint service program established by the Department of Defense to develop future identification systems has been effective.

On June 11, 1985, we testified on the results of our review before the Subcommittee on Legislation and National Security, Committee on Government Operations, House of Representatives

We are sending copies of this report to the Director, Office of Management and Budget, and to the Secretaries of Defense, Air Force, Army, and Navy.



Charles A. Bowsher  
Comptroller General  
of the United States

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# Executive Summary

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## Purpose

The Department of Defense (DOD) estimates that it will spend over \$200 billion to acquire high technology weapons with an air defense role. These systems cannot be used effectively without adequate aircraft identification capabilities. Since modern air warfare can involve large numbers of friendly and hostile aircraft, the identification of friend or foe is critical. The lack of adequate identification could cause mistaken attacks on friendly aircraft or cause restrictions on the use of air defense weapons to preclude mistaken attacks.

GAO made this review to determine (1) if air defense weapon system operators will be able to effectively use their weapons under all combat conditions, (2) whether the joint service program established by DOD to develop improved identification capabilities has been effective, and (3) whether more could be done to use existing systems more effectively.

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## Background

The United States and the North Atlantic Treaty Organization (NATO) strategy is to acquire weapon systems which are technically superior to those of the Warsaw Pact nations. An ability to identify aircraft as friend or foe at beyond visual ranges is a critical requirement if this strategy is to be successful.

Aircraft identification methods are characterized as direct or indirect. Direct identification is "cooperative" when friendly aircraft actively participate in the identification process, for example, through electronic question and answer systems. Direct identification is "noncooperative" when it relies on identifying certain unique features such as the shape of a plane. Indirect identification occurs when information about the target's identity is gathered and passed to weapons operators through communications systems.

The effect of inadequate aircraft identification capabilities was demonstrated when Egyptian and Israeli forces shot their own aircraft in the 1973 Middle East War, and by Israeli helicopter losses in the 1982 Syrian-Israeli conflict.

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## Results in Brief

The United States and NATO air defenders cannot distinguish between friendly and enemy aircraft under all operational conditions. Consequently, in the event of hostilities, decisionmakers may be forced to choose between the risk of mistakenly shooting at friendly aircraft or severely restricting the use of their air defense weapons—either of which would severely impair their combat effectiveness.

Little progress has been made to develop and field improved identification capabilities. Although DOD established a joint program office in 1980 to develop improved identification capabilities, it may be more than 10 years before new systems can be fielded.

Army and Air Force units in Europe do not use the Mark XII identification system to its full potential. This situation exists, in part, because inconsistent command emphasis has resulted in limited use of the system in day-to-day operations, inadequate operator training, and poorly defined operating procedures.

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## Principal Findings

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### Identification Problems Hinder Operations

The United States and NATO forces cannot identify aircraft at beyond visual ranges, at night, or in bad weather with a high degree of confidence. Visual identification is a short-range capability which places air defense weapons and operators in the lethal range of enemy attackers and cancels any advantage held in long-range weapons. The Mark XII, a 1950-era direct cooperative question and answer device used to identify similarly equipped friendly aircraft, has weaknesses reflecting its advanced age. Noncooperative identification systems have not been widely implemented and the indirect identification system is seriously deficient regarding its timeliness, capacity, and survivability. As a result, increased reliance is being placed on procedural identification, including the use of safe corridors to prevent mistaken attacks. These rudimentary procedural identification techniques reduce operational flexibility and are susceptible to deception, exploitation, and confusion.

Poor identification has impaired operations. Peacetime exercises and evaluations show that because of poor identification, United States and allied forces may shoot at their own aircraft. To reduce this possibility, restrictions have been placed on the use of air defense weapons that could impair combat effectiveness.

### Development of Needed Systems Has Been Slow

Little progress has been made in developing and fielding new systems since the need was identified in the mid-1970s. A triservice Combat Identification System Program Office (CISPO) was established by DOD in 1980 to direct, coordinate, and oversee triservice efforts to develop improved combat identification capabilities. CISPO efforts to date have

essentially been confined to developing the Mark XV, the United States candidate for a NATO interoperable replacement for the Mark XII. The services have not supported the joint program office, limiting the scope of its efforts. Until January 1985, CISPO made very little effort to identify and coordinate service-unique noncooperative programs. Indirect identification subsystem development programs have been left entirely to the individual services.

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### Better Use of the Mark XII Is Necessary

While Navy commanders emphasize the use of the Mark XII during routine training operations and exercises, Air Force and Army commanders in Europe do not emphasize its use to a similar extent. Better use of the Mark XII by Army and Air Force units in Europe is necessary because (1) it is the only available, fully operational identification system, (2) its replacement, the Mark XV, will not be fully operational until the late 1990s, and (3) improved noncooperative and indirect systems are at best several years away

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### Recommendations

GAO recommends that the Secretary of Defense elevate the CISPO to a higher level of authority within DOD to ensure that identification requirements are adequately considered in major weapon system acquisition programs and to ensure that the program office has the authority to obtain the personnel needed to accomplish the program objective.

Additional recommendations to the Secretaries of the Army and the Air Force to increase the effectiveness of the Mark XII are presented on pages 40 and 41

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### Matters for Consideration by the Congress

Before authorizing and appropriating future funds for major air defense weapon systems, the Congress may want to consider whether the weapons will have adequate aircraft identification capabilities to allow their effective use without significant risk of mistaken attacks. For that consideration, the Congress may wish to ask DOD to clearly identify (1) the identification capabilities needed for the most effective use of air defense weapons, (2) when the needed capability will be available, and (3) what restrictions on use of weapon systems will be necessary until the needed identification capabilities are available

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### Agency Comments

DOD agreed that identification is critical for the effective use of air defense weapons, that procedural identification methods are a weak

alternative, and that opportunities exist for enhanced use of the Mark XII. DOD only partially concurred that (1) existing identification capabilities are inadequate, (2) identification is a long-standing problem, (3) efforts to address the problem have been slow, and (4) identification requirements have not been adequately addressed in weapon system procurements. DOD believes that GAO does not sufficiently describe the difficulties in solving this problem, nor does it fully recognize the substantial progress that has been made toward its solution.

GAO agrees that the problem is a difficult one, but disagrees that substantial progress has been made toward solving it. The need to limit the use of existing air defense weapons with heavy use of procedural controls and restrictive rules of engagement or accept the possibility of mistaken attacks, demonstrates the inadequacy of existing identification capabilities. GAO also believes recognition of an urgent need for enhanced identification capabilities in the mid-1970s and the fact that only limited improvements will be fielded by the early to mid-1990s demonstrate that it is a long-standing problem and that progress has been slow. DOD's comments are included as appendix IV and are discussed in more detail in chapter 5. (See pp. 41 to 45 )

In commenting on GAO's recommendations, DOD agreed that:

- It needs to reexamine CISPO's organizational placement, but was not yet in a position to agree or disagree with GAO's recommendation to elevate the CISPO to a higher level within DOD. DOD declined to take a position until its study, which is expected to recommend improvements in CISPO's organizational placement, is completed
- The manpower provided to CISPO by the services is inadequate but saw no need for the Secretary of Defense to become involved in the issue unless the services could not resolve it.
- The Army and Air Force could increase the effectiveness of Mark XII by emphasizing its importance and by improving the training and evaluation programs for the system. DOD said a plan is being prepared to achieve these objectives





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